NOAA Restoration Day - 2007
Setup Instructions For Growing Wild celery

PREPARATION AND SETUP:

1. Prepare the growth chamber:

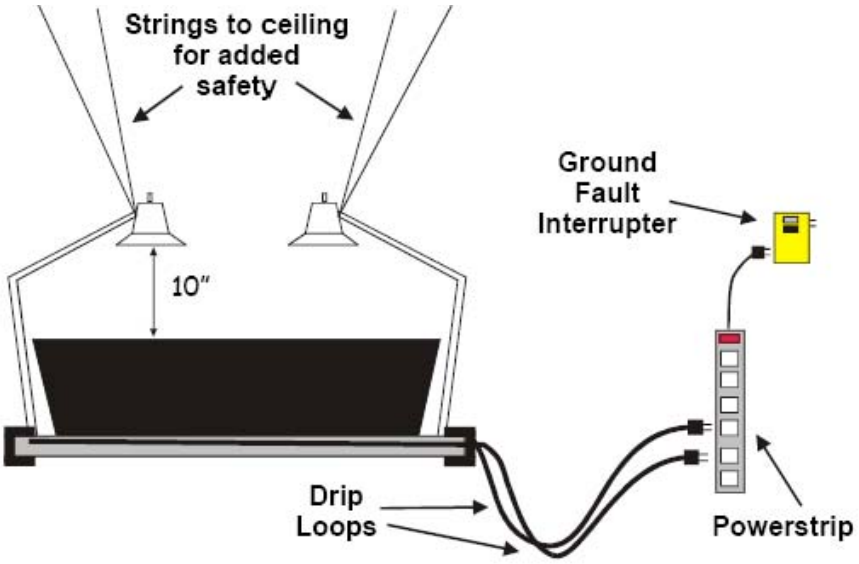
This project is fairly easy to set up and maintain, but it will require some planning on your part. Please take a look at the time requirements in the box below. Then read through the detailed description of the steps that follows**.**

TIME NEEDED FOR SYSTEM SETUP AND MAINTENANCE:

15 minutes of work for you, then 1 day in refrigerator: *At least one day before you want to plant the wild celery seeds*, break each pod into several pieces. Squeeze out the seeds and gelatinous substance that encases them into a jar of cold water. The gelatin will break down in about 24 hours. **Place this jar in the refrigerator until you are ready to plant the seeds** (and label it clearly so it does not get thrown away).

30 minutes: assemble Bay grass growth chamber (attach and assemble lights, assemble filter, fill black tub with water, add heater, and plug in heater and filter).
30 minutes: separate seeds into 3 batches, shake up each with sand in plastic bag**,** cover sediment in pan with seeds mixed with sand and then sand, lower into water in tub.
Daily: check water, temperature, sponge, and algae level of growth chamber, add water and rinse sponge
1 day: attend June 12 planting event at Jug Bay --"NOAA Restoration Day."

Once you have all the components for your Bay grass growth chamber (see checklist of materials needed), you will need to assemble them in your office. You will not be able to move this tank when it has water in it, so choose your location carefully. A good location would be on a sturdy table near an electrical outlet. It is best to identify a location with **high visibility** so that we can increase education about the project and the importance of underwater grasses in the Bay. The system does not need to be located near a window, but it does need to be in a room with a stable temperature. Assemble the growth chamber, add water, and stabilize water temperature before adding the seeds. The workshop will demonstrate what the system should look like once it's fully assembled. The illustration below will also give you some guidelines:

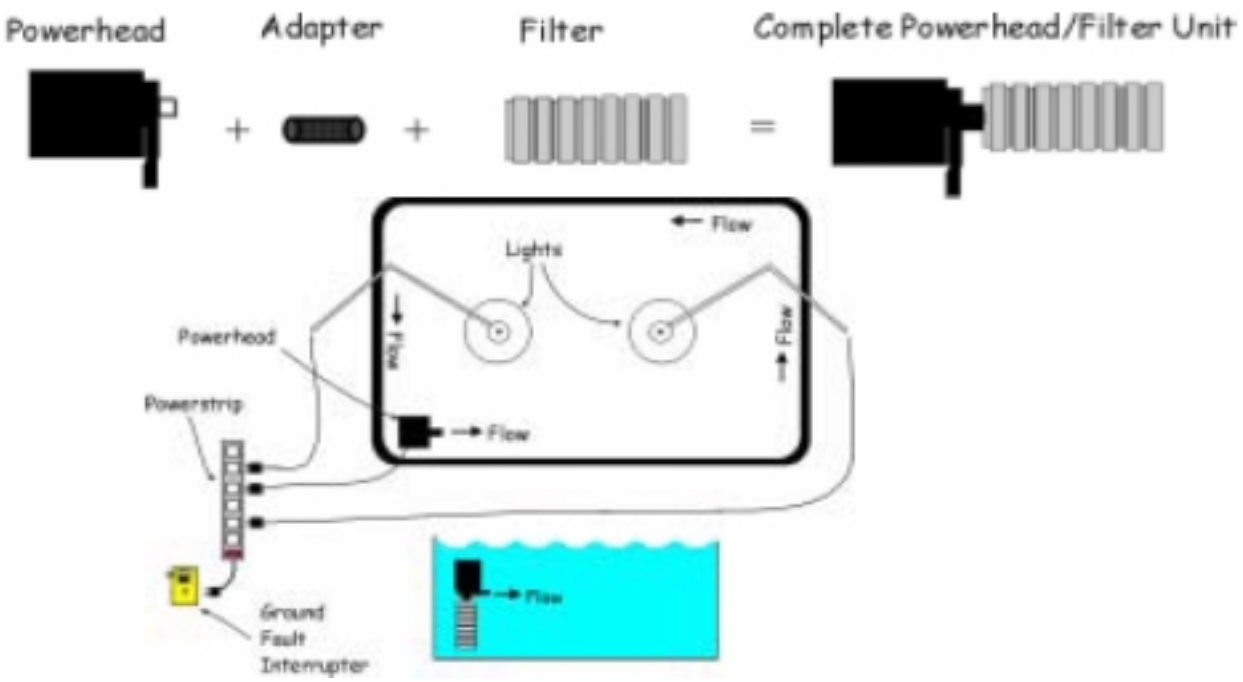


Growth chamber setup:

A. Place tub on a sturdy table or file cabinet. A table with thin edges to which you can clamp the lights works best. If the edges are too thick, slide a piece of plywood under the tank to create a lip you can clamp the lights on to. If you need to buy a table, Office Depot sells one with folding legs that works well, 2'x4' for $30 that makes a great printer or work table after the project is over.

B. Assemble the lights and attach to the table so they can sit about 10" above the water surface, equidistant from each other, the tank edges, and the middle of the tank. An optional wood block may be used for extra stability attaching the lights to the side of the tub. **Note: safety precautions must be followed when dealing with the lights**. The lights must be plugged in to the power strip with a Ground Fault Interrupter (GFCI) attached. *Do NOT use a different power strip since it will not include the GFCI.* You may also attach string from the lights to the ceiling for added safety. The lights (as well as the pump and the heater) should be kept on 24 hours a day to promote plant growth. If you choose to use compact fluorescents instead to save energy, use only the "daylight" bulbs which have the colors of light that the plants need.

C. Prepare the pump by attaching the conical plug or strainer to the water intake of the powerhead. Keep in mind that the powerhead has a number of additional attachments that are not necessary for our purposes. All you will need is the cone shaped or strainer attachment on the intake and the suction cup bracket to attach the powerhead to the side of the tub; you can use a nozzle on the outflow fitting to direct the water. Then attach the sponge filter over the intake, either slipping it over the cone shaped attachment, or fitting it into the hole, depending on which kind you have. It's a snug fit. The sponge filter will prevent debris particles from clogging up the powerhead. It will also provide a place for helpful bacteria cultures to grow. Attach the powerhead with filter to the side of the tub using the suction cup bracket. Make sure that the water flow isn't disturbing the sediment, but it should circulate water through the whole tank. You may have to experiment with the placement of the powerhead to get the best water flow. See the illustration below for guidance:



D. Fill the tank with water. Regular tap water is fine. Once you add plants, the water level needs to be somewhere between the top of the leaves and the top of the tub at all times. Fill it about half full to start, then add more water when the 3 pans are all in. If the faucet in your sink is too low to get a bucket under it, a 2.5 gallon collapsible water jug sold in camping stores works very well.

E. Test the lights. **Please note: anything plugged into the power strip should have a "drip loop" to prevent water from accidentally dripping into the power strip.**

F. Plug in the powerhead to the power strip (leave it on). It should immediately begin circulating water in your tank. Make sure water is circulating well but not splashing out of the tank, and that the suction cups are firmly attached to the side of the tub.

G. Set the *unplugged* heater thermometer to **80 degrees** and attach it to the inside of the tank close to the bottom, **then** plug it in to the power strip and leave it on. *If it is plugged in when not in water it overheats and can melt the plastic tub*. (This is warmer than in the past, to get longer plants.)

2. Add the Bay grass seeds: Remember they have to be separated from the pods and stored in the refrigerator for at least a day before planting (see above).

Once the seeds have been separated and stored, take your pans filled with a sand/soil mixture, separate your seeds into 3 batches, mix each batch of seeds with sand and spread them on top of one pan, sprinkle more sand on top, and finally carefully lower the covered pan into the water in the black tub, as described in detail below.

Planting procedure:

NOTE: spreading the seeds must be done BEFORE you lower the pans into the water in the tub.

A. ***(We will do this before you get the pans.)*** Thoroughly mix equal amounts of **top soil** and **all purpose sand (reddish)** in a container. Fill each pan with this mix to within about 1 inch of the top. Pack the mixture in firmly with your fingertips.

B. Divide the seeds into 3 equal parts after pouring out as much of the water as possible, then spreading the wet seeds on a piece of white office paper, blotting dry with paper towels, and **discard any seed pod material.** Then divide the seeds into 3 piles of roughly equal size.

C. In a quart size freezer Ziploc bag, add 1 of these 3 portions of seeds to 1 cup of the sand that was set aside. The sand should be as dry as possible before you add the seeds. Shake this mixture in the quart size freezer Ziploc bag for 2 minutes. Sprinkle this sand/seed mixture evenly over the sediment mixture in the planting pan.

D. Sprinkle an additional 2 cups of sand from the sand set aside over the sand and seed mixture. This should be a very thin layer (about 1/8 of an inch). If this layer is too thick, your seeds will not germinate. (See next page for diagram)

E. Once you have your tank set up and filled with water, use a fine mist sprayer to **thoroughly water the pans.** Take care not to disturb the layer of sand and seeds on top. (optional)

F. Cover the pan with a sheet of rigid foam or corrugated cardboard (puncture it several times to add small air holes) and lower each pan gently into the water. You can also use 2 plastic grocery bags overlapped to cover the pan if you have no foam. (Take off your watch first unless it is waterproof.) Remove the cover once air bubbles stop coming out, being careful not to disturb the soil.

You should see some growth within 2 weeks; if you do not, contact Alison Hammer and she may have some extra seeds.

Maintenance: A few minutes each day is all you need to keep your grasses growing and healthy!

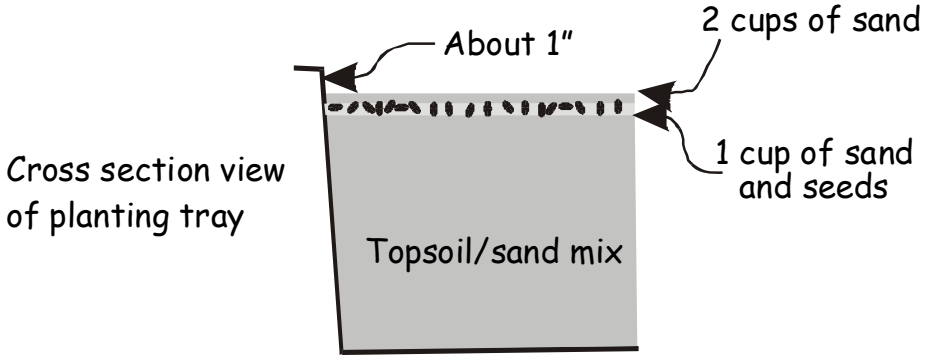
A. Check water level - it is OK to ignore the plants for a few days at a time without worries PROVIDED THE WATER LEVEL IS ADEQUATE. If the water level drops below the powerhead intake or the heater, they will break and an electrical shock could result. Water level will drop about 1-2 inches per week, or about a gallon a day, but this could vary significantly by location. Be sure that tanks are well filled before leaving for long weekends. You may want to mark the side of the tub for the ideal water level so that you know when to refill.

B. Clean filter and algae – the sponge filter attached to the powerhead will need to be **rinsed in tap water as it accumulates debris, or it will clog**. Check it periodically but remember that it also houses beneficial bacteria, so don't use any cleaners or rinse it too often. As algal growth builds, you may see a green sheen on the plants, sand, water surface, or tub. You can use your fingers to gently wipe off algae from plant stems. A fine mesh fish net works well for skimming the water surface and the tub can be wiped with a cloth. Do this as often as needed. Make sure the power head is firmly attached when you replace the sponge filter; **if it comes loose it may spray water out of the tank.** To remove long, stringy, filamentous algae, you can gently rake your fingers or a paper towel through the tank.

C. Monitor temperature – The water temperature should **stay near 80 degrees F**. Check the floating thermometer regularly to make sure you have the optimal conditions for germination and growth. You may need to periodically adjust the heater to above or below 80, depending on the thermometer reading.

Preparing the grasses for planting:

You will need about an hour on the morning of the planting day to prepare your plants for transport. Disassemble the lights, powerhead, and heater. Keep the thermometer in the tub to monitor temperature throughout the day. Lower the water level so that there is just enough water to keep the plant parts submerged. **Wet newspapers must be used** on top of the grasses to keep from splashing and drying out during transport. If the plants are well covered with several layers of wet newspaper you may not need to keep any water in the black tub, which makes it much easier to transport. Ice should be added to the tub on top of the newspapers if it is a hot day or very sunny.



QUESTIONS? If you have **any problems or questions** about the system, please contact Alison Hammer (301-713-3000 x110, alison.hammer@noaa.gov) or Peter Bergstrom (410-267-5665, peter.bergstrom@noaa.gov).